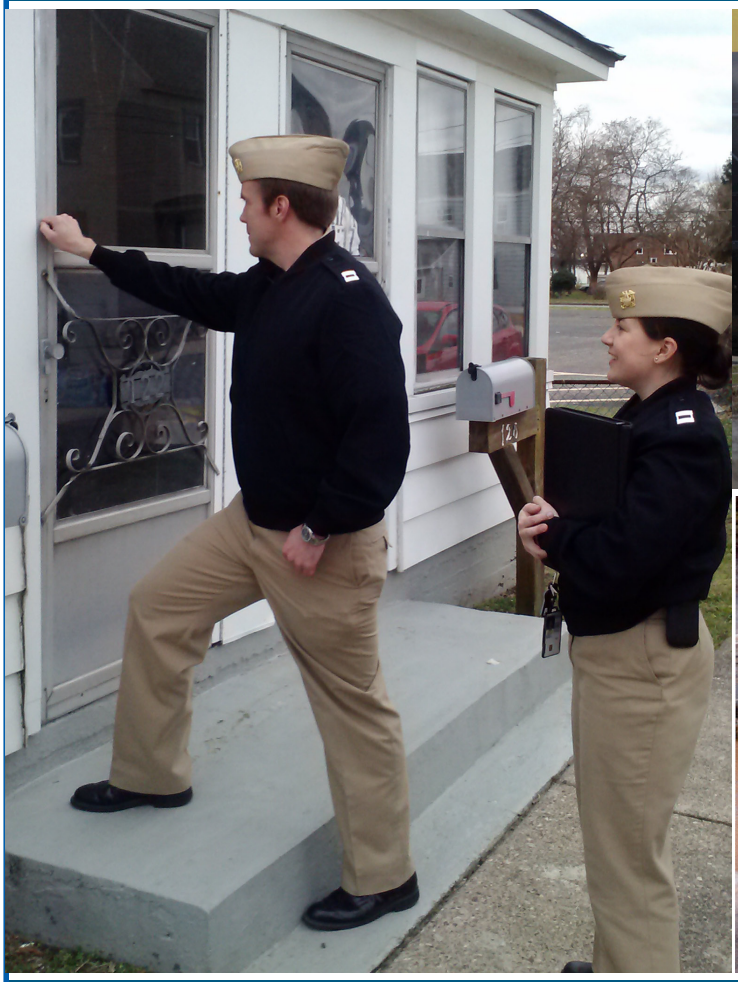
ASSESSMENT OF CHEMICAL EXPOSURES WORKBOOK

Rapid Assessment of Exposure and Health Effects after Acute Chemical Incidents



Agency for Toxic Substances and Disease Registry
Division of Toxicology and Human Health Sciences

Scene of train derailment in South Carolina. Photo by: South Carolina Department of Health and Environmental Control.

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Everyone in the United States is at constant risk of exposure from chemical incidents. Whether we are adults at home or work, or whether we are children at school or play, thousands of chemicals surround us. Yet we have little information about these chemicals or the threats they pose if released[1]. Everyone needs to know what to do in the event of a chemical incident. Questions you might ask if a chemical incident occurs in your community include:

- What health effects can I expect following exposure to certain chemicals?
- If an evacuation from a neighborhood or workplace is necessary due to a chemical incident, what is the best evacuation route?
- Are local fire and police departments prepared to deal with the effects of a chemical incident?
- Can hospitals treat large numbers of persons possibly exposed during a widespread chemical incident?

[1]Barrett J, Goure M, Gore D. 2008. Chemical and biological threats: Surveillance as the first line of defense. Arlington VA: The Lexington Institute. Available at http://www.lexingtoninstitute.org/library/resources/documents/Defense/chemical-biological-threats.pdf. Accessed 01/31/2013.

In 2010, the Agency for Toxic Substances and Disease Registry—known as ATSDR—introduced the National Toxic Substance Incidents Program as a comprehensive program for surveillance of hazardous chemical incidents. The program's purpose is to protect people from hazardous chemical incidents.

States that participate in the program gather data on chemical incidents. The data includes incident location, incident cause, evacuation details, number of injured persons, and adverse health effects experienced by those injured or exposed. Program personnel then enter the information into a Web-based database. The database is used to develop and implement procedures to prevent or reduce the morbidity and mortality caused by chemical releases. It also is used to assist in preparing for future chemical incidents.

The National Toxic Substance Incidents Program (NTSIP) has three primary components: 1) state surveillance, 2) a national database, and 3) incident investigations—that is, Assessment of Chemical Exposures, or ACE. This training focuses on how the ACE team and its resources can help build capacity at your state and local community level to respond to chemical incidents.

If a chemical incident occurs in your state or community, the ACE team is available to help your state or local health department. For example, the ACE team might:

- Provide surveys, databases, and training to help build state and local capacity to conduct an assessment after a chemical incident
- Travel to your state and help with collection of rapid assessment data
- Help to review data and to answer concerns of the affected population
- Provide other resource materials as requested

About the Workbook

This workbook is part of the Assessment of Chemical Exposures (ACE) training course. The course is one of the tracks in the Disaster Epidemiology Training offered by the Council of State and Territorial Epidemiologists, in collaboration with three federal partners:

- Agency for Toxic Substances and Disease Registry (ATSDR)
- Centers for Disease Control and Prevention National Center for Environmental Health (NCEH)
- National Institute for Occupational Safety and Health (NIOSH)

The workbook contains brief descriptions of both ATSDR and the National Toxic Substance Incidents Program. It highlights key actions for state and local health departments in the preparation and data collection phases of a rapid assessment after a chemical incident. In each section, you will find learning objectives, key concepts, action items, case studies and examples. At the end of the workbook, there are resources for further information.

This training also helps meet the CDC's Public Health Preparedness Capabilities: National Standards for State and Local Planning's Capability 13 functions:

- **Function 1:** Conduct public health surveillance and detection
- **Function 2:** Conduct public health and epidemiological investigations
- **Function 3:** Recommend, monitor, and analyze mitigation actions
- **Function 4:** Improve public health surveillance and epidemiological investigation systems

Training Agenda

This course teaches you how to conduct a rapid assessment so that you can collect epidemiologic data after a chemical incident, analyze the data, and address the concerns of the affected community. This workbook shows you how to request the ACE team for assistance, what you need to do to prepare for and implement a rapid assessment, and what you can do with the data you collect. This workbook is a reference to use during the course and a refresher for conducting an assessment in the future.

This workbook has five chapters, which are noted at the bottom of each page:

Introduction: Describes the organization in which the ACE team operates, gives you information about the ACE toolkit, and shows you the benefits of a post-chemical incident rapid assessment.

Preparation for an Assessment: Helps you determine the resources you need for your assessment, what questions you need to answer before data collection, and who should be involved in the assessment.

Data Collection: Describes the different data collection processes you can use, offers suggestions about how to choose the appropriate data collection method (for example, in-person versus telephone surveys), and offers some tips for working safely in the field.

Summary: Provides an overview of the process and highlights the potential benefits of a rapid assessment using the ACE toolkit.

Resources: Lists additional materials and tools that are available to help you with your assessment.

Train derailment response South Carolina. Photo by: South Carolina Department of Health and Environmental Control.

Table of Contents

Chapter 1. Introduction

This chapter describes ATSDR and NTSIP. The chapter lays out how to do epidemiologic investigations of chemical incidents and introduces the ACE toolkit.

Learning Objectives

- Describe the focus and role of ATSDR in epidemiological response after chemical incidents
- List the goals of NTSIP
- Explain the role of ACE
- Understand the contents of the ACE Toolkit

Key Concepts

In this chapter, you will learn how ATSDR and NTSIP can provide assistance to your state or local community through the ACE program. While ATSDR and NTSIP can fulfill many roles, this workbook focuses on the assistance from the ACE team and the ACE toolkit. To get started, the organizational chart below describes the responsible organizations for ACE; we will go over each of the main components in more detail.

The National Toxic Substance Incidents Program is a three-component program within ATSDR with objectives to 1) reduce morbidity and mortality from chemical incidents, 2) use data collected to target prevention programs, 3) improve preparedness and response, and 4) monitor the effects of its interventions.

Agency for Toxic Substances and Disease Registry

Agency Focus

The Agency for Toxic Substances and Disease Registry is a nonregulatory, federal public health agency in the U.S. Department of Health and Human Services. Co-located in Atlanta with the Centers for Disease Control and Prevention, ATSDR is administratively grouped with the CDC National Center for Environmental Health. ATSDR focuses on environmental health and toxic exposures.

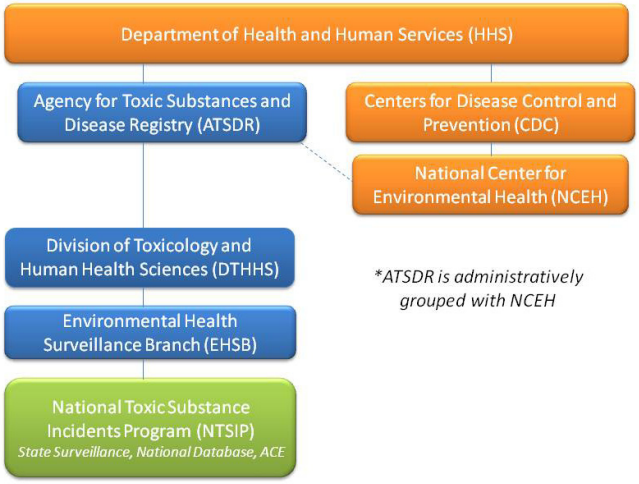


Figure 1: Organizational Chart—Where ACE Fits In

Key Roles of ATSDR

- Investigate exposures related to chemically contaminated sites and incidents
- Identify potential exposures, assess associated health effects
- Recommend actions to stop, prevent, or minimize harmful effects of chemical exposures
- Create resource materials for chemicals such as Toxicological Profiles, ToxFAQs (hazardous substance fact sheets), and Medical Management Guidelines
- Maintain registries of persons with certain exposures or diseases that may relate to environmental exposures

National Toxic Substance Incidents Program

Program Focus

For the past 20 years, ATSDR has had state-based chemical incident surveillance. Through the Hazardous Substance Emergency Events Surveillance or HSEES program, which ran from 1993 through 2009, ATSDR had cooperative agreements with 19 states at varying times. The state health departments collected detailed data on toxic substance incidents, entered those data into the ATSDR database, and performed prevention activities.

Introduced in 2010, the National Toxic Substance Incidents Program (NTSIP) is a comprehensive approach to toxic substance surveillance, prevention, and response. NTSIP collects and combines information from many sources to protect populations from harm caused by toxic substance releases. Data collected through this program can help prevent or reduce the morbidity and mortality caused by chemical incidents as well as assist in planning for response to future chemical incidents. With NTSIP, the state-based surveillance from HSEES continues, with two additional components added to the program. The three components of the NTSIP are 1) state surveillance, 2) national database, and 3) Assessment of Chemical Exposures (ACE) incident investigations.

Key Roles of NTSIP

- Enter data collected on chemical incidents at the state level into a database to help with preparedness training, targeted prevention activities, and identification of health effects of chemical exposure.
- Use data collected and reported from the partner states, coupled with supplemental data from governmental reporting agencies (i.e., Department of Transportation and National Response Center), to create national estimates of chemical incidents. The national estimates are important for monitoring of trends and disseminating information about chemical exposure prevention.
- Provide assistance to state and local health agencies, through a deployment or provision of resources and materials, to investigate large-scale chemical incidents to gain a better understanding of health effects and provide recommendations for response to future incidents.

Epi-Aid is a mechanism by which ATSDR provides assistance to states.

The ACE program uses this mechanism to send personnel to assist on an epidemiologic response to a chemical incident. Upon receiving an invitation from the state epidemiologist, ATSDR deploys Epidemic Intelligence Service (EIS) officers and other ATSDR staff, as needed, to support the state's needs.

See http://www.cdc.gov/nceh/eis/epi_aid.html for more information.

Assessment of Chemical Exposures (ACE) Component

Component Focus

Through the ACE component of NTSIP, ATSDR helps investigate incidents in which 30 or more persons have been exposed to a toxic substance at levels that could produce acute health effects. The ACE team deploys on an Epi-Aid through CDC's Epidemic Intelligence Service Program within 1–2 days of receiving a request for assistance from a state epidemiologist.

For those unfamiliar with the Epi-Aid program, it is a mechanism commonly used by the CDC and ATSDR to provide assistance to a state, tribal, or local health department. See the Preparing for an Assessment section for further detail on Epi-Aids.

In addition to providing assistance to your state or local health department through an Epi-Aid, ACE has also put together a toolkit with various resources (see Tables 1–2) and created training courses—such as this one—to help you conduct a rapid assessment when a chemical incident occurs in your community.

Key Roles of ACE

Through ACE, ATSDR provides assistance to state and local agencies with public health response after chemical incidents to:

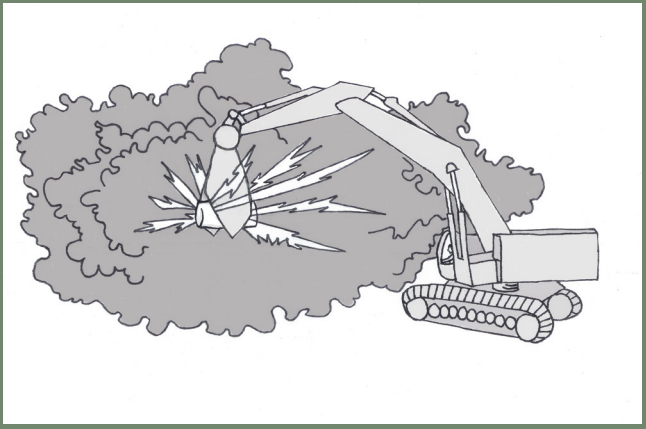
- Register persons exposed to large-scale acute chemical incidents
- Characterize exposure and acute health effects
- Describe needs resulting from the exposure
- Identify communication issues that arose during a response
- Make recommendations for prevention and response to future chemical incidents

Benefits of Assessments after Chemical Releases

Assessments of chemical incidents have many potential benefits for community members, for state or local health departments, for emergency responders, and for federal agencies. Some of the potential benefits include:

- Community members
  - Know the impact on their community

ACE Highlight: An ACE team assisted the California Department of Public Health (CDPH) with an epidemiologic assessment when a 1-ton canister containing chlorine gas was cut at a metal recycling facility, exposing 29 workers, customers, and bystanders. Using surveys in the ACE toolkit, CDPH, the local health department, and the ACE team collected data to evaluate the health effects of the exposure, determine the cause of the release, and make recommendations to prevent similar incidents in the future. As a result of the findings, CDPH prepared an information sheet about the dangers posed by canisters and how to work safely with them. The information sheet was distributed to all metal recycling facilities in California and, through a trade association, outside of the state.



Chlorine release at metal recycling facility in California. Illustration by: Christine Hannigan, California Department of Public Health.

  - Receive benefits from aid that may result from assessment
  - Receive results of any testing that is completed
- Local and state health department
  - Reassure the community by action
  - Know the impact on the community
  - Better direct aid to the affected community
  - Identify issues to address on emergency plans
  - Improve community preparedness
- Emergency responders
  - Identify issues to address on emergency plans
  - Identify training gaps and/or occupational safety and health issues
  - Identify best methods of communication with the public
  - Assess shelter-in-place efficacy
- Federal agencies
  - Describe acute health effects of chemical exposures
  - Identify recurring issues to be addressed in mass casualty plans
  - Identify cohorts that may be followed for persistent health effects of acute exposures

The ACE Toolkit

ATSDR may provide tools, expertise, laboratory support, and personnel to aid you in performing assessments of exposure and resulting health effects after chemical incidents. Through the assessment, you can learn the impact of the incident on the community and the needs of those exposed to the toxic substance(s) during the incident.

Several surveys and forms are available for use in an epidemiologic investigation of a chemical incident, which from now on we will refer to as the ACE Toolkit. The toolkit contains resources to assist you with collecting information from affected populations, reviewing medical records, conducting specimen testing, and managing data. These resources are customizable to your incident's unique situation. Below are tables summarizing the toolkit's resources.

Table 1: ACE Toolkit, Data Collection Tools			
Surveys and Forms	Purpose	Information Collected	Notes
General Surveys	Use one General Survey for each adult or child age 13 and older that you interview.	• Exposure • Acute health effects • Demographic information • Medical history • Occupational history • Communication	This form has been translated into Spanish.
Child Surveys	Use one Child Survey for each child under age 13 who the respondent reports was in the affected area during the incident. This form can also be used if a parent provides information about their teenaged child.	• Exposure • Acute health effects • Demographic information • Medical history	This form has been translated into Spanish.
Pet Surveys	Use a Pet Survey if the adult respondent reports having a pet or assistance animal that was in the affected area during the incident.	• Exposure • Physical characteristics • Effects of exposure	This form has been translated into Spanish.
Supplemental Forms	Use these forms when a table provided in the General or Child Survey does not provide enough space for all collected information. These supplemental forms are numbered according to the question number.	Additional information that does not fit in the original space provided on the surveys.	These forms are available, but do not have to be used; you may instruct interviewers to write additional information in the margins.
Hospital Survey	Use one hospital survey for each hospital that received victims of an incident.	• How the hospital learned of the incident • How much time the hospital staff had to prepare • Staff or resources needs • Lessons learned	
Rapid Response Registry Form	This form can be used to gather contact information before a more extensive survey can be organized. Or, if limited information is required, it may be the only survey performed.	• Essential demographic information • Limited exposure and outcome information • Two event-specific questions	This form has been translated into Spanish, Chinese, and Vietnamese.
Medical Chart Abstraction Form	This form can be used to abstract information from hospital charts about medical care provided as a result of the incident.	• Health effects • Transport for medical care • Required treatment	
Data Management	A data management system that can readily be adapted to the questionnaires and medical chart abstraction forms is available.	Data are entered into a database and can be exported for analysis in other statistical programs.	The Data Management Guide contains further information.

Table 2: ACE Toolkit, Assent/Consent Forms			
Assent/ Consent Forms	Purpose	Information Collected	Notes
Informed Consent	All respondents age 18 and older should sign this form. The respondent should sign and date the form before beginning the interview.	• Survey purpose • Survey process • Selection process • Respondent rights • Confidentiality	This form has been translated into Spanish.
Child Assent/ Parent Permission	All children ages 13–17 should sign this form. A parent or guardian should also sign it. This form is similar in structure and content to the Informed Consent Form.	• Survey purpose • Survey process • Selection process • Respondent rights • Confidentiality	This form has been translated into Spanish.
Medical Records Release Form	If your agency does not have the authority to conduct medical chart reviews after chemical incidents without obtaining patient permission, respondents who received medical care due to the incident should sign the form.	• Abstraction purpose • Participant rights • Confidentiality	This form has been translated into Spanish. If the respondent is under age 18, the parent or guardian is asked to sign the consent form.
Veterinary Records Release Form	The adult pet owner should sign this form. You have an opportunity to ask this question during the General Survey.	• Abstraction purpose • Participant rights • Confidentiality	This form has been translated into Spanish. The ACE toolkit does not have a veterinary record abstraction form. Investigators can collect information similar to that collected during medical cart reviews at hospitals.
Clinical Specimen Testing Consent and Assent Forms	If a blood or urine test is available for assessing exposure to the substance released, samples may be collected and tested.	• Sample purpose • Sample process • Selection process • Participant's rights • Confidentiality	These forms have been translated into Spanish. Consent forms for adults are available case, as well as assent forms for both teenagers and younger children.

Case Study #1

In this chapter, you learned about the ACE program and the ACE toolkit available to you for response to an acute chemical incident occurring in your state. Here are some questions to ask yourself as you get started:

- How would you find out about an incident if it happened in your state?
- What questions do you need to ask when you receive a report of a chemical incident?
  - What are the timelines, affected areas, and exposed populations?
  - Who is involved in the response?
- What would you like to learn about this incident?

Hole in tanker car from vinyl chloride incident in New Jersey. Photo by: Mary Anne Duncan.

Chapter 2. Preparation for an Assessment

Learning Objectives

- Initiate an assessment and request Epi-Aid
- Start an assessment and assemble a team
- Prepare for a day in the field

Key Concepts

Before you begin any type of assessment, you need to know the information you want to obtain, the purpose for which it will be used, and how quickly you need to obtain it. This includes knowing the community and state agencies and offices with whom you might need to collaborate in order to carry out the assessment. In this chapter, you will learn how to identify the goals of an assessment, work with partners, and get ready to take a team into the field.

How an Assessment is Initiated

Once someone contacts you about a chemical incident in your community, you will have decisions to make. Will you do an epidemiologic assessment? If so, do you have the internal resources to do it or will you ask for help from other agencies such as ATSDR to send the ACE team on an Epi-Aid?

To help answer these questions, you will need to think about the following three items: 1) the goals of your assessment, 2) the components of your assessment, and 3) your partners. You might not decide these items in this order; sometimes you might select partners first and your team can then identify the goals together. You should decide how to proceed based on the situation you are facing.

Creating Goals for your Assessment

To help you determine whether you have sufficient resources available, prepare for requesting an Epi-Aid, and set the stage for your assessment, it is critical that you first determine the following two goals: 1) What do you want to accomplish/learn; and 2) What will you do with the data? Here are some examples of different outcomes in which states have set goals to achieve using an assessment:

- Determine scope of incident and associated health effects
- Provide information to decision makers
- Direct aid / provide support to the affected community
- Prevention outreach
- Evaluate emergency response
- Form registry of exposed persons to follow for long-term health effects
- Evaluate health department's capacity to respond to chemical incidents
- Train staff in field investigations

Deciding on Components for your Assessment

Once you have determined what you want to accomplish with your assessment, you can begin to think about what tools and resources can be used to help you achieve your goals. To select properly, you need to collect as many details as possible about the incident. You might start by conducting key-informant interviews with persons from the following areas or obtain data from:

- Local environmental health and public health staff
- Responders
  - Police, fire, HAZMAT, EMS
- Hospitals / medical facilities
- Business
  - Owners, managers, workers
- Veterinarians, county agricultural extension agents
- Media reports (Note: these are not always accurate)

Using the information you collect about the incident from these key informant interviews, you can then select the tools you will need to accomplish your goals. Refer to the ACE Toolkit (Tables 1-2) for a complete list of tools available to you through the ACE Program. Some examples are the Rapid Response Registry, ACE surveys for interviews with exposed persons, and hospital surveys.

At the conclusion of this training, we will provide you with the ACE Toolkit. If you decide to use the ACE Toolkit for an assessment in your jurisdiction and you need the materials sent to you or you want to ensure you have the most current materials, contact the ACE program by phone (404-567-3256) or email (atsdrace@cdc.gov).

Selecting Partners

By now, you should have a clearer picture of what happened during the incident. And you should have identified your goals and selected your tools. You should now move forward with selecting partners who can assist you with the assessment. As you consider who to approach for assistance, ask yourself the following questions:

- How big a team will you need to accomplish the assessment goals?
- How much time will the team need to spend on the assessment?
- How many people are available to respond?
- Which agencies are already involved?

To get you started, here are some potential partners who have assisted with assessments during previous chemical incidents:

- Local, regional, state public and environmental health agencies
- ATSDR ACE through an Epi-Aid
- ATSDR regional representatives
- Poison center
- NIOSH / OSHA / state OSHA
- School of public health / university
- Medical / veterinary association
- State veterinarian's office and the U.S. Dept. of Agriculture

Inviting the ACE Team

If you need additional resources, expertise, or staff to complete your assessment, consider asking the ACE team to assist. If you would like to request ACE assistance through an Epi-Aid, here are the criteria for an incident to qualify:

- Incidents in which ≥30 persons are exposed to a toxic substance
- Acute exposure
- Chemical capable of producing serious health effects

ACE Highlight: An ACE team assisted the Arkansas Department of Health (ADH) with an epidemiological assessment following a chlorine incident at a poultry processing facility. The ACE investigation pointed out that the Arkansas Department of Emergency Management (ADEM) had not notified the health department of the incident when it occurred. A large number of the exposed persons were not native English speakers and communication difficulties occurred both at the scene and at responding hospitals. The health department had several staff members fluent in the needed language who could have assisted had they been notified. A review of the ADEM notification procedures revealed a very high threshold for notification of the ADH. The notification procedures were modified to include any biological, chemical, radiologic, or nuclear incident. About 2 weeks after the procedures were modified, two ammonia incidents occurred on one morning in the same city at different facilities. Notification of the ADH occurred promptly and the ADH offered assistance.

If your chemical incident meets these criteria, to complete your request for ACE assistance you will need to:

- **Contact ACE program**
  - 404-567-3256
  - atsdrace@cdc.gov
  - CDC Emergency Operations Center 24/7: 770-488-7100, request Assessment of Chemical Exposures (ACE) program

- There is a mutual decision between you and the ACE team to proceed
- You work together with the ACE team to develop goals for the assessment
- The state's EIS officer, if applicable, is offered the option of leading the Epi-Aid
- Your state epidemiologist submits a formal, email request to the EIS Program for the Epi-Aid
- The ACE team can arrive within 1–2 days of receiving the request

Meeting with the press after the train derailment in South Carolina. Photo by: South Carolina Department of Health and Environmental Control.

You can send a request for Epi-Aid before you completely identify your team. The EIS Officer selected to lead usually helps with the Epi-Aid paperwork. That officer can also assist with identifying additional EIS officers, fellows, and ATSDR staff with appropriate backgrounds for the ACE team.

Regardless of who is involved in the assessment, it is critical to have a meeting to discuss goals, outline roles and responsibilities, share contact information, prepare data collection tools, and plan the investigation.

Starting your Assessment

One of the first steps is to set up a conference call between you and your partners to discuss the following:

- Who will participate and what will be their roles (new roles may evolve once you get into the field, but assign as many as you can up front)
  - Involvement of other agencies
  - Special skills needed by team members
  - Arrival date and estimated duration of response
- A list with contact information for team members
- Finalizing the survey with incident-specific information
- A place for the team to work
- Computer and data management capability

If the ACE team deploys on an Epi-Aid and sufficient time is available after the surveys and consent forms are finalized, ATSDR will submit an emergency amendment request for Institutional Review Board (IRB) review of these items. If IRB approval is obtained, the data can be combined with data from other ACE investigations for additional analysis in the future.

Note: **You are the lead on the assessment**. If requested, the ATSDR team will be there to support your goals of the investigation. The ACE team will meet with you, evaluate the incident, and help plan the investigation. To learn more about the incident, the ACE team may work with you to interview responders and others involved in the incident to get a feel for what happened and use that information to tailor the questionnaire.

Preparing for the assessment of the metal recycling facility chlorine incident in California. In photo: Left: Ekta Choudhary (EIS Officer); Right: Rachel Roisman (California Department of Public Health).

Action Items: Checklists for Preparation

Here is what you need to do to carry out the key concepts noted above and discussed in the lectures.

Checklist: Putting together a team

- ❑ Determine who will participate and define their roles:
  - ❑ Assess potential team members' availability
  - ❑ Determine arrival date and estimated duration of response
  - ❑ Get approval for the members to participate
  - ❑ Consider involvement of other agencies and necessary special skills
- ❑ Put together a contact information sheet
- ❑ Schedule a conference call to launch the assessment (items to discuss are listed in the Starting your Assessment section)
- ❑ If you plan to collect samples for testing, set up a call with the NCEH laboratory and state lab to discuss:
  - ❑ Which lab will complete the testing
  - ❑ Which test will be completed
  - ❑ How to obtain samples
  - ❑ How to ship samples to the laboratory

Checklist: Preparing for data collection

- ❑ Plan the assessment:
  - ❑ Update surveys and consent forms with event-specific information
  - ❑ Select the parts of the survey to be used; add or modify questions as needed
  - ❑ Determine whether you will interview all exposed people or select a sample
  - ❑ Determine languages(s) to use
  - ❑ Put together teams that will conduct the interviews
  - ❑ Select interview mode (e.g., Web-based, in-person, telephone, mailed)
- ❑ IRB emergency amendment request, if applicable
- ❑ If you're completing a community survey, determine whether you need to contact the local police
- ❑ Determine computer and data management capability for selected tools
- ❑ Adapt the ACE database(s) to the surveys that you will use

Checklist: Preparing for team members

- ❑ Determine where the team will work
- ❑ Plan for a kick-off meeting
- ❑ Set up a meeting with local environmental health officer, first responders, and others who can describe what happened
- ❑ Make arrangements to visit the scene and, if applicable, tour the facility
- ❑ Set up meetings with the preparedness coordinator or other staff at responding hospitals

Checklist: Preparing for work in the field

- ❑ Make hotel, flight, and rental car or motor pool arrangements (if necessary)
- ❑ Request maps from GIS group
- ❑ Determine how to print and copy surveys, consent forms, and medical chart abstraction forms
- ❑ Check out computers and gather equipment
- ❑ Make arrangements to be away from home
- ❑ Stay in touch with team members for logistics
- ❑ Pack appropriate weather gear and supplies for administering the surveys

Checklist: First day activities

- ❑ Host kick-off meeting
- ❑ If the incident is ongoing, check in with health department emergency operations center or incident command center
- ❑ Make arrangements for the next day:
  - ❑ Meet with facility management and tour facility or site, if applicable
  - ❑ Conduct interviews with exposed persons
  - ❑ Arrange for meeting with hospital(s) (medical chart reviews can be conducted at this time or another time can be scheduled)
  - ❑ Determine whether you need to interview any other parties
- ❑ Send a daily report to the team and partner agencies to include:
  - ❑ Summary of what you have learned about the incident
  - ❑ Activities of the day
  - ❑ Plans for the next day
  - ❑ Update on injured persons (count of those seen at health care facilities, number still hospitalized)
  - ❑ Update on activities at scene, if applicable

Case Study #2

In this chapter, you learned how to begin an assessment by creating goals, selecting tools to collect the data you need, and putting a team together. As you prepare to take action, here are some questions you will need to keep in mind:

- What objectives would you want to accomplish if this incident happened in your area?
- Would you request an Epi-Aid? If you decide to move forward with an Epi-Aid, what information do you need for the request?
- Whom would you invite to partner with you on this response?
- What steps do you need to take to prepare your team for a day in the field?

Discussing the map from the metal recycling facility chlorine incident in California. In photo: Left: Ekta Choudhary (EIS Officer); Right: Jeff Henry (ACE Team Member). Photo by: Mary Anne Duncan.

Chapter 3. Data Collection

Learning Objectives

- Select a sample and interview method
- Conduct a successful interview, stay safe in the field, and protect respondents' rights
- Use data management tools
- Create products using collected data

Key Concepts

In this section, you will learn how use the ACE tools to collect data, how to conduct a safe and effective interview, how to manage the data, and what to do to wrap up the assessment.

Table 3: Overview of Survey Methods

Survey Method	Strengths	Weaknesses	Notes
In-person	✓ Highest response rates ✓ Best option for low literacy respondents ✓ Ability to use maps or showcards ✓ Best opportunity to build rapport ✓ Ability to probe vague and nonresponsive answers	☒ Expensive ☒ Time consuming ☒ Social desirability may prevent respondents from admitting to undesirable behavior (e.g., smoking)	Most common method for ACE surveys, especially for incidents that occur in the community.
Telephone	✓ High level of quality control ✓ Use of random selection methods ✓ High response rate ✓ Easier to conduct than in-person surveys, especially if you have insufficient staff	☒ Cannot sample homes without home telephones ☒ Cannot use maps or show cards ☒ Potential demographic biases (i.e., age, income, race, education level)	This method can be used if the incident occurred at a business or exposed persons do not live in a localized area, thus making it difficult for interviewers to reach everyone in-person after an incident.
Web-based surveys	✓ Low cost ✓ Reduced coding errors ✓ Greater flexibility	☒ Lower response rate ☒ Measurement bias—people more computer savvy will respond ☒ Security issues—how best to protect the data?	This is a new method for ACE surveys. This option may be helpful for follow-up data collection.
Mailed Surveys	✓ Easier to conduct than in-person surveys when there is insufficient staff ✓ Can be used to supplement in-person surveys ✓ Use of random selection methods	☒ Expensive ☒ Low response rate ☒ Time consuming to complete (wait for surveys to be returned and send reminders)	This option has been used as a supplement to in-person interviews and may be helpful for follow-up data collection.

Survey Methods

Taking into consideration the affected community's characteristics, your budget, and the number of exposed persons, you will need to think about what method you want to use to conduct your assessment interviews. We have typically conducted the ACE surveys in person, but telephone, Web-based, and mailed surveys are also options.

Preparation for the Survey

Planning

Before beginning an assessment using your tailored ACE tools, you will need to finalize all of your plans and make sure you have answered the following questions:

- Which survey interview method will you use?
- Will you survey everyone who was exposed or will you select a sample?
- Are the surveys finalized so you can print (if in-person) and administer them? This includes all tools (e.g., General Survey, Child Survey, Medical Chart Review Form, Hospital Survey, consent forms).
- Will you distribute a fact sheet about the chemical to participants? If so, have you identified one that meets your needs, or have you developed one?
- In what language will you administer the surveys? Do you have interviewers fluent in languages other than English?
- Are survey teams set up?
- Are data management systems ready for use?

Sample Selection

If the number of potentially exposed persons in a community incident exceeds what you could hope to interview in 2 weeks, you will want to do some kind of sampling. Here are examples of different methods you can use:

- Community sampling (recommended): sample 60% from high, 20% from medium, and 20% from low exposure zones
- Define the area of interest by street boundaries or radius
- Address-based random sampling or other sampling method (e.g., Community Assessment for Public Health Emergency Response two-stage sampling)
- Interview all persons in a household or 1 adult and 1 child
- Among incident responders or employees, conduct a simple random sample
- Interview a subgroup or other convenience sample

Potential Challenges

With every assessment, you will need to prepare for potential roadblocks that could slow you down or limit the number of surveys you are able to complete. Having open communication with the parties involved and being aware that situations could arise will make your assessment less stressful. Here are some examples of roadblocks previously encountered in the field:

- Inability to find people you want to interview
- Legal involvement that slows the process
- The need to respond to inquiries from outside agencies
- Jurisdictional issues
- Slow response from hospitals for requests to schedule medical chart reviews

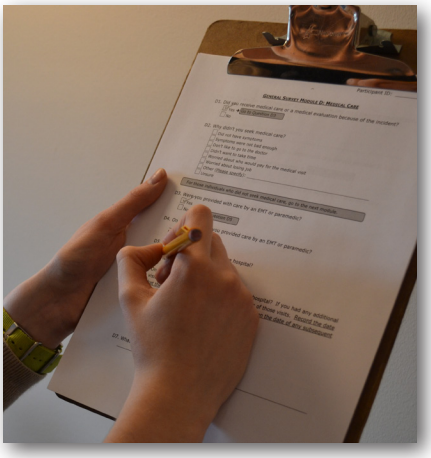
Survey Materials

When preparing to administer the survey, make sure that you have the following materials on hand to complete your work:

- Copies of the survey
- Map of the affected area
- Consent / assent forms
- Rapid Response Registry data, if previously collected
- Clipboard, pens (or digital pens), stapler, or small binder clips (if interviewing in person)
- Computer (if using telephone survey and want to enter data as you complete the interview)

Conducting the Survey

This section provides a broad overview of some of the practices previously used in the field for safety, ethical behavior, and effective interviews. Although much of this information applies to in-person interviewing, the ethics guidance and tips for successful interviews also apply to other data collection methods.



Completing an ACE Survey. Photo by: SciMetrika

Interview Safety

When in the field conducting in-person interviews, it is critical that you protect yourself by maintaining situational awareness.

While active in the community, travel in pairs, do not wear jewelry, keep your belongings in the trunk of your car, and move your car with you. When on the resident's property, be on the lookout for dogs; if you see an unrestrained dog, you should request that the owner restrain the animal, even if it seems friendly. Observe the resident; be open and friendly to obtain participation, but if you are threatened in any way, leave the premises immediately.

Most importantly, listen to what the local police have to say about the area. If the police recommend that you be out of an area by a certain time, respect their request; they would not make it without good reason.

Data Security

To protect the respondents' privacy, plan to de-identify the surveys. You might want to have a cover page for identifying information that you keep separate from the surveys. Or, you might want to keep copies of the paper surveys secure and not enter the identifying information into the database. While you can keep the identifiable records in your state's database, data should always be de-identified before you share it with anyone else, including federal agencies such as ATSDR.

Web-surveys and hand-held devices require extensive security measures. It may take time to get security requirements in place and obtain approval for their use, so keep this in mind if you wish to use either of these tools.

Respondents' Rights and Consent

Interviewers must know, understand, and protect the rights of study participants. These rights include:

The right of informed consent. This is the legal requirement that respondents receive complete and accurate information so that they can make an informed decision about their participation in the survey. The information must be understandable and complete, and must convey that participation is voluntary.

The right to refuse. Once an interview has begun, a person has the right to decline to participate further in the survey or to refuse to answer individual questions. While it is helpful to know why persons do not want to participate in a survey, those who refuse have no obligation to state a reason. Participation is always voluntary, and you must respect anyone's refusal to participate.

The right of privacy. The Federal Privacy Act of 1974 prohibits the release of personal data gathered by or for a federal agency without the respondent's written consent. Individuals or organizations that violate this law are subject to fines and penalties. You can explain this to a respondent when trying to gain his or her trust. Any written reports will only include summary data from all the respondents.

The right to accurate representation. This is the right that requires honesty in dealing with respondents and answering their questions about the survey. For example, you cannot tell the respondent that an interview will take only a few minutes if you know it will last about 30 minutes. And, you most definitely cannot tell respondents they are required to participate in the survey.

Guidelines for a Successful Interview

This section includes guidelines for a successful interview and for obtaining participation/overcoming objections. The section also shows how to conduct the interview.

Best Practices

The advice below comes from the observations of experienced interviewers and the practices they thought most often led to successful interviews. Before you conduct your first interview, keep the following practices in mind:

- Be knowledgeable about the survey and be convinced of its importance
- Maintain ethical standards
- Stay within the scope of the interview you are conducting
- Listen to and respond to participants' needs and concerns
- Follow all procedures and instructions
- Pay attention to details
- Be neat, organized, professional, and confident

Tips for Obtaining Participation

During ACE investigations, interviewers found that people who have been exposed during a chemical incident typically want to tell their story. They are happy that someone from the health department is there to check out the situation and respond to their concerns. To build rapport early, you should project confidence and a positive attitude. You should acknowledge and respect peoples' time, and be responsive to their concerns and needs.

If a person is unsure of participating, emphasize the importance of feedback. Stress that the information that person provides will remain confidential. Offer to try a few questions and see how it goes. If the person appears busy, offer to come back another time. Throughout the exchange, always remain courteous and professional. If, however, the person really does not wish to participate, respect the right to refuse and move on to the next person. You want to be persuasive and assertive without ever becoming aggressive.

Conducting household surveys after vinyl chloride incident in New Jersey. In photo: Left: Jason Wilken (EIS Officer); Right: Kim Brinker (EIS Officer). Photo by: Mary Anne Duncan.

Asking the Questions

To ensure that the data gathered from each survey are consistent and analyzable, when conducting an interview it is vital that you follow these rules:

- Use the exact words written on the paper
- When instructed, read response categories
- Ask questions in order
- Read the complete question and response options
- Read questions slowly
- Use introductory or transitional statements as they are written
- Do not suggest answers
- Read all questions to all respondents
- Do not speak in a way that sounds judgmental

Probing

Probing is a technique to help ensure the respondent's answers are as accurate and complete as possible. When probes are neutral or nondirective, they serve two purposes:

- They help the respondent understand the question
- They help obtain a clear response from the respondent without suggesting answers

General probing techniques include:

- Repeating the question—this is the best and most straightforward method
- Repeating the answer choices
- Pausing to allow the respondent time to think and to imply you need further information
- Asking clarifying questions (e.g., what do you mean?). But do not try to suggest words or answers for the respondent

Overall ACE Survey Details to Know

Before conducting interviews, you should know some unique characteristics about the ACE surveys. Understanding the structure of the surveys will help ensure the interview runs smoothly. Recommendations to prepare include:

- Study the map before the first interview
- Record Participant ID, Household ID, and Interviewer ID at the top of the first page
- Record Participant ID on every page
- Be familiar with the numbering system of the general and child surveys
- Record extra information that seems important in the margins
- If the respondent doesn't know dates or time frames, collect what information you can and record that in the margins
- If you run out of room on a table, use a supplemental table form
- If specified, read the response choices aloud to respondents. If not specified, don't
- If there are instructions to read response choices, do not read "Don't know" or "Unsure"
- Follow interviewer instructions (e.g., underlined text, skip patterns)

Want more detail about how to conduct an ACE survey? Review the guidelines and methods provided in the ACE Interviewer Training Manual provided on your CD. In this manual, you will find further detail about all of the topics discussed in this section including understanding respondents' rights, maintaining safety in the field, obtaining participation, asking the survey questions, probing, and understanding the ACE survey features.

After Data Collection

After you collect your data, you should have a plan for data entry and analysis and a plan for concluding your assessment.

Data Management

Data entry and analysis help you organize the data you collect to enable you to interpret your findings. Your findings provide evidence to support any recommendations or conclusions you draw from your assessment. Please refer to your Data Management Guide provided on your CD for further information about the data management system ACE can provide to you as part of the ACE Toolkit.

Concluding the Investigation

You now have the data you need to support developing or putting into practice public health actions or products appropriate for your community. Examples of public health actions include follow up with exposed persons or setting up a free clinic where residents can get physical exams, pulmonary testing, and access to a social worker. Examples of products developed from previous ACE assessments include a fact sheet or alert, presentation at a public health meeting, debriefing at conclusion of the assessment, a database for follow-up assessments, and a journal or *Morbidity and Mortality Weekly Report* article.

Case Study #3

Using the information you have learned in this course, you should be able to select and use an appropriate data collection method, manage your data, and put into practice the public health actions and products which, based on your findings, you deem most appropriate. While taking these actions, however, consider the following:

- Which survey interview method will you use?
- Will you survey everyone exposed or will you select a sample?
- If selecting a sample, which method will you use?
- What are a few important practices to remember while interviewing?
- Do you have a plan to protect respondents' privacy and rights?
- How will you prepare for data management? What tools will you need?
- What are you going to do with the data?
- What products do you want to develop?

Reviewing data from the metal recycling facility chlorine incident in California. In photo: Left: Rizwan Riyaz (CDC Medical Toxicology Fellow); Center: Rachel Roisman (California Department of Public Health); Right: Ekta Choudhary (EIS Officer). Photo by: Mary Anne Duncan.

Chapter 4. Summary

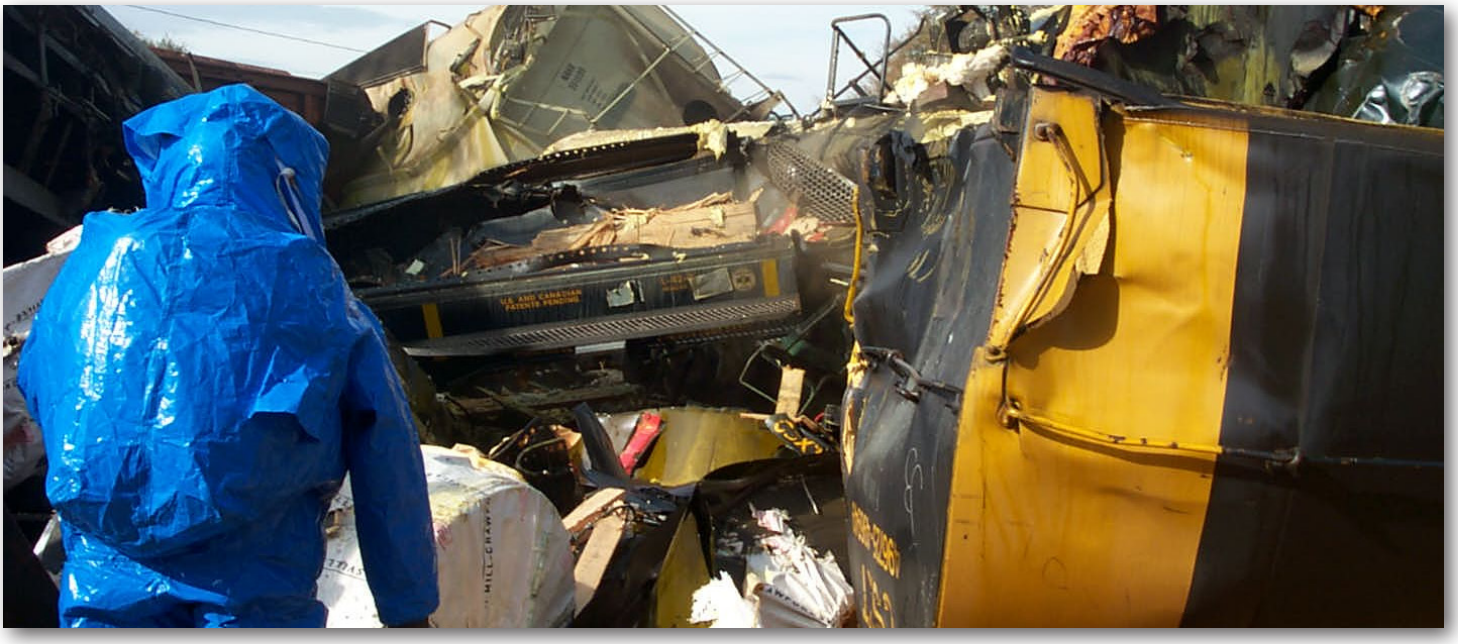
This course introduced you to the Assessment of Chemical Exposures (ACE) program. The course also showed you the tools available for data collection, and showed you how to conduct an assessment after there is an acute chemical release incident in your jurisdiction.

Through the ACE program, you have access to a group of tools that help you collect data from the exposed community, emergency response personnel, and hospitals about exposure information, communication, and community needs. Depending on what you want to find out from your assessment, you can use these tools to reassure community members that you are taking action, help you understand how the community has been impacted, identify where you can provide aid to the community, and improve community preparedness for future chemical incidents.

To collect successfully the data you need, you need to follow certain procedures to protect respondents' rights, to build rapport, and to collect analyzable data. ACE has developed the ACE Interviewer Training Manual, a valuable tool that details how to obtain participation, protect participants' rights, and conduct a successful interview.

If a chemical incident occurs in your state, you do not have to handle the situation alone. This workbook introduces you to a list of potential partners whom you can reach out to for assistance. And through the Epi-Aid mechanism you can request that an ACE team deploy to provide assistance with your assessment.

By collecting data on what happened, what exposure and health effects resulted, and how the response played out for a mass casualty incident, you can make important public health contributions—helping those affected, preventing future releases, and improving the response to future mass casualty incidents.



Assessing the damage from the train derailment in South Carolina. Photo by: South Carolina Department of Health and Environmental Control.

Chapter 5. Resources

Resources on your CD

- ACE fact sheet
- Rapid Response Registry—English, Spanish, Mandarin, Vietnamese
- General survey—English and Spanish
- Child survey—English and Spanish
- Pet survey survey—English and Spanish
- Hospital survey
- Medical chart abstraction form
- Consent forms—English and Spanish
- ACE Interviewer Training Manual
- Assessment of Chemical Exposures Workbook
- Data Management Guide
- Course Presentations

Resources for More Information

- ATSDR Homepage: http://www.atsdr.cdc.gov/
- NTSIP Homepage: http://www.atsdr.cdc.gov/ntsip/
- ACE Response Team Page: http://www.atsdr.cdc.gov/ntsip/Response_Teams.html
- ACE Webinar: http://www.atsdr.cdc.gov/ntsip/docs/ACEwebinar.pdf
- Overview of ACE and Contact Information: http://www.atsdr.cdc.gov/ntsip/docs/ACE_factsheet.pdf
- Links to NTSIP publications: http://www.atsdr.cdc.gov/ntsip/publications.html
- Epi-Aid Website: http://www.cdc.gov/nceh/eis/epi_aid.html
- Rapid Response Registry (also contains guidance for preparing for a deployment): http://www.atsdr.cdc.gov/rapidresponse/

The findings and conclusions in this workbook have not been formally disseminated by the Agency for Toxic Substances and Disease Registry and should not be construed to represent any agency determination or policy.

National Toxic Substance Incidents Program, ACE Response Team

404-567-3256

atsdrace@cdc.gov

http://www.atsdr.cdc.gov/ntsip/Response_Teams.html